

What Is Claimed Is:

1. A control apparatus for an in-cylinder injection internal combustion engine,

5 upon satisfaction of a preset engine stop condition during operation of the internal combustion engine, said control apparatus executing an engine stop control to stop the operation of the internal combustion engine in a state of a lowered valve-side fuel pressure on a fuel injection valve-side
10 in a pressurized fuel supply unit than a fuel pressure level under a normal operation of the internal combustion engine, where the pressurized fuel supply unit pressurizes a fuel flow and supplies the pressurized fuel flow to a fuel injection valve of the internal combustion engine.

15

2. A control apparatus in accordance with claim 1, upon satisfaction of a preset engine restart condition, said control apparatus executing an engine restart control to restart the operation of the internal combustion engine, which has been
20 stopped by the engine stop control.

3. A control apparatus in accordance with claim 1, wherein the engine stop control starts injection of a fuel from the fuel

injection valve and fires the injected fuel in the internal combustion engine to lower the valve-side fuel pressure.

4. A control apparatus in accordance with claim 1, wherein
5 the engine stop control stops the operation of the internal combustion engine only after lowering the valve-side fuel pressure.

5. A control apparatus in accordance with claim 1, wherein
10 the engine stop control stops the operation of the internal combustion engine only after lowering the valve-side fuel pressure to or below a preset reference fuel pressure, which is set to ensure startability for a restart of the internal combustion engine under the engine restart control.

15

6. A control apparatus in accordance with claim 1, said control apparatus comprising a temperature detection-estimation unit that either detects or estimates a temperature of the internal combustion engine or an ambient
20 temperature of the ambient air in proximity to the internal combustion engine,

wherein the engine stop control stops the operation of the internal combustion engine in the state of the lowered

valve-side fuel pressure, which decreases to a lower level with an increase in temperature detected or estimated by the temperature detection-estimation unit.

5 7. A motor vehicle, comprising:

an in-cylinder injection internal combustion engine that outputs a power for driving said motor vehicle; and

an engine control apparatus that, upon satisfaction of a preset engine stop condition during operation of the internal
10 combustion engine, executes an engine stop control to stop the operation of the internal combustion engine in a state of a lowered valve-side fuel pressure on a fuel injection valve-side in a pressurized fuel supply unit than a fuel pressure level under a normal operation of the internal combustion engine,
15 where the pressurized fuel supply unit pressurizes a fuel flow and supplies the pressurized fuel flow to a fuel injection valve of the internal combustion engine.

8. A motor vehicle in accordance with claim 7, said motor
20 vehicle further comprising a motor that outputs a power for driving said motor vehicle.

9. A motor vehicle in accordance with claim 8, said motor

vehicle running with a changeover of a drive mode between an engine drive mode using the output power of the internal combustion engine and a motor drive mode using only the output power of the motor.

5

10. A motor vehicle in accordance with claim 9, wherein upon satisfaction of a preset engine restart condition, the engine control apparatus executing an engine restart control to restart the operation of the internal combustion engine,
10 which has been stopped by the engine stop control.

11. A motor vehicle in accordance with claim 9, wherein the engine stop control starts injection of a fuel from the fuel injection valve and fires the injected fuel in the internal
15 combustion engine to lower the valve-side fuel pressure.

12. A motor vehicle in accordance with claim 9, wherein the engine stop control stops the operation of the internal combustion engine only after lowering the valve-side fuel
20 pressure.

13. A motor vehicle in accordance with claim 9, wherein the engine stop control stops the operation of the internal

combustion engine only after lowering the valve-side fuel pressure to or below a preset reference fuel pressure, which is set to ensure startability for a restart of the internal combustion engine under the engine restart control.

5

14. A motor vehicle in accordance with claim 9, said motor vehicle comprising a temperature detection-estimation unit that either detects or estimates a temperature of the internal combustion engine or an ambient temperature of the ambient air
10 in proximity to the internal combustion engine,

wherein the engine stop control stops the operation of the internal combustion engine in the state of the lowered valve-side fuel pressure, which decreases to a lower level with an increase in temperature detected or estimated by the
15 temperature detection-estimation unit.

15. A control method of an in-cylinder injection internal combustion engine,

upon satisfaction of a preset engine stop condition
20 during operation of the internal combustion engine, said control method executing an engine stop control that starts injection of a fuel from a fuel injection valve in the internal combustion engine and fires the injected fuel to lower a

valve-side fuel pressure on a fuel injection valve-side in a pressurized fuel supply unit than a fuel pressure level under a normal operation of the internal combustion engine, where the pressurized fuel supply unit pressurizes a fuel flow and
5 supplies the pressurized fuel flow to a fuel injection valve of the internal combustion engine,

the engine stop control stopping the operation of the internal combustion engine in a state of the lowered valve-side fuel pressure.

10

16. A control method of the internal combustion engine in accordance with claim 15, upon satisfaction of a preset engine restart condition, said control method executing an engine restart control to restart the operation of the internal
15 combustion engine, which has been stopped by the engine stop control.

17. A control method of an internal combustion engine of the motor vehicle running with a changeover of a drive mode
20 between an engine drive mode using the output power of the internal combustion engine and a motor drive mode using only the output power of the motor,

upon satisfaction of a preset engine stop condition

during operation of the internal combustion engine, said control method executes an engine stop control to stop the operation of the internal combustion engine in a state of a lowered valve-side fuel pressure on a fuel injection valve-side
5 in a pressurized fuel supply unit than a fuel pressure level under a normal operation of the internal combustion engine, where the pressurized fuel supply unit pressurizes a fuel flow and supplies the pressurized fuel flow to a fuel injection valve of the internal combustion engine; and

10 upon satisfaction of a preset engine restart condition, said control method executing an engine restart control to restart the operation of the internal combustion engine, which has been stopped by the engine stop control.

15